

N^o 19,963



A.D. 1913

Date of Application, 4th Sept., 1913

Complete Specification Left, 24th Feb., 1914—Accepted, 4th Sept., 1914

PROVISIONAL SPECIFICATION.

**Improvements in and relating to Automatic Couplers for
Railway Carriages, Waggon and the like.**

I, GEORGE JOHNSTON, of 16, Balmoral Road, Fairfield, Liverpool, Engineer,
do hereby declare the nature of this invention to be as follows:—

This invention relates to an automatic coupling device for railway carriages,
waggon and the like, of that class in which a knuckle or coupling hook is pro-
vided, pivoted to the drawhead, and having a tail piece adapted to be retained in
the locked position by a slidable locking pin in the draw-head. The object of
the present invention is directed to providing a coupling which shall be more
efficient in action and stronger in construction than those at present in use.

According to the present invention the hook is so constructed and pivoted to
the drawhead that when closed any buffing impact on the outer member of the
hook will be met by a direct thrust against the drawhead, the engaging faces
of the pivoted hook and the drawhead which take such impact being made
more or less flat and disposed at right angles to the direction of impact. In a
similar way, the construction of the hook is such that when the coupler is closed
and locked and connected to another coupler the pull on the engaged outer
element of the pivotal hook is directly in line with the locking pin, and the pull,
therefore, maintained in a central line through the drawhead to the shank and
draw-bar of the coupler. The interior configuration of the hook is made of
standard interchangeable formation to enable it to couple with hooks of other
standard existing types. Means are also provided, consisting of a rising and
falling weight, or the like, for automatically opening the pivoted hook when
the locking pin is withdrawn, such rising and falling weight always tending to
press the pivotal hook outward. A further feature of the invention relates to
the means whereby when the locking pin is raised from engagement with the
tail piece of the hook, it is caught and held in such raised position, and is pre-
vented from falling into the drawhead below the hook, and thus avoids
being fractured by the closure of the pivotal hook, a projection on the
pivotal hook being provided for disengaging the catch mechanism on the pin
and releasing it from its set position as the pivotal hook is closed, thus allowing
it to drop automatically into the locked position.

In one form of coupler the drawhead, connected to a drawbar or shank of the
usual pattern, is provided with a bearing socket at one side for the pivoted pin
of the hook. The opposite face of the drawhead is provided with an inclined
centrally deflecting impact surface of the usual type. The central portion of
the drawhead, between the bearing socket and the inclined impact face, is
slotted horizontally to receive a projecting tail piece or eye on the pivotal hook.
Vertically through this horizontal slot is formed a socket, within which is
slidably mounted a locking pin of any suitable section. The locking pin is
fitted with a hanging pivoted pawl or catch provided with a rear heel, such
heel, as the locking pin is raised, being engaged by an abutment in the draw-
head, which forces out the pawl from its slot in the locking pin and causes it
as the pin falls again to engage upon a ledge in a recess formed in the upper

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part of the drawhead. Disposed, preferably, in that part of the drawhead near the bearing socket is a vertical chamber within which is slidably mounted a weight, such weight being fitted with a projecting prong or the like normally resting on and bearing against the pivotal hook, in such manner, that the action of the weight tends to cause the hook to open out from the drawhead, and retain it in its fully open position against a suitable abutment. The lower part of the weight chamber is provided with a stop which may be adjustable, such stop limiting the fall of the weight and preventing the prong from assuming a horizontal position, and thus avoid any liability of the weight binding in the chamber when the pivotal hook is closing. The pivotal hook is provided with overhanging lugs formed on the upper and lower faces of the hook, such lugs engaging above and below the bearing socket and being connected thereto by the pivotal pin. The outer member of the hook is vertically perforated to provide for ordinary connection with the usual coupler mechanism of rolling stock, and a recess or the like is formed in the inner engaging face of the hook, with which recess the prong on the slidable weight is adapted to engage. The inner face of the pivotal hook is made flat to bed when closed against the central flat portion of the drawhead, and from, preferably, the central part of this inner face of the hook projects a tail or eye piece adapted to engage within the horizontal slot of the drawhead, and, when the hook is closed, register with the locking pin sockets in the drawhead. When, therefore, the hook is closed, the perforation in the hook registers with the sockets in the drawhead, and when the locking pin is down the coupling is locked. A projection on the tail piece of the hook is so arranged that when the hook is in its open position such projection masks the socket of the locking pin and prevents the latter from falling below the tail piece except when the hook is closed. A tongue is also provided, preferably, at the upper part of the hook, such tongue being adapted to engage and press the hanging pawl of the locking pin off its retaining ledge in the drawhead, as the hook closes, thus enabling the locking pin to fall into engagement with the eye.

In operation, the hook being closed and the locking pin in its locked position, in order to set the coupling, the locking pin is lifted until its hanging pawl engages on the ledge of the drawhead. The falling weight simultaneously causes the hook to open, and the coupling is in its open position. As the coupling makes impact with another coupling, the hook element is closed, the tongue on the hook disengaging the hanging pawl and enabling the locking pin to fall into its closed position.

In a modification, in place of the lugs on the pivotal hook engaging above and below the bearing socket of the drawhead, upper and lower lugs may be formed on the drawhead between which the lugs of the pivotal hook engage.

In both forms described, the disposition of the outer member of the hook with reference to the drawhead is such, that, supposing the hook to be in its closed position and the buffing impact to take place on the outer member of the hook, as frequently may occur in shunting operations, the direct line of such impact will be through the outer member of the hook the flat inner engaging face of the hook bearing against the corresponding surface of the drawhead. Similarly the outer member of the hook is so arranged that the pull thereon by the corresponding member of an opposite coupling is in a direct axial line with the locking pin in the drawhead. Such an arrangement of the knuckle or hook enables a much lighter construction to be effected than would be possible in other forms.

Dated this 3rd day of September, 1913.

For the Applicant,

A. J. DAVIES,
Patent Agent by Examination,
87, Moorfields, Liverpool.

Impts. in Automatic Couplers for Railway Carriages, Waggon and the like.

COMPLETE SPECIFICATION.

Improvements in and relating to Automatic Couplers for Railway Carriages, Waggon and the like.

I, GEORGE JOHNSTON, of 16, Balmoral Road, Fairfield, Liverpool, Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

5 This invention relates to an automatic coupling device for railway carriages, waggon or the like, of that class in which a knuckle or coupling hook is provided, pivoted to the drawhead, and having a tail piece adapted to be retained in the locked position by a slidable locking pin in the drawhead. The object of the present invention is directed to providing a coupling which shall be more
10 effective in action and stronger in construction than those at present in use.

According to the present invention the hook is so constructed and pivoted to the drawhead that when closed any buffing impact on the outer member of the hook will be met by a direct thrust against the drawhead, the engaging faces of the pivoted hook and the drawhead which take such impact being made
15 more or less flat and disposed at right angles to the direction of impact and extending on both sides of the line of draft. In a similar way, the construction of the hook is such that when the coupler is closed and locked and connected to another coupler strain in either a pulling or buffing direction on the engaged outer element of the pivotal hook is directly in line with the locking
20 pin, and the strain is, therefore, maintained in a central line through the drawhead to the shank and draw-bar of the coupler. The interior configuration of the hook is made of standard interchangeable formation to enable it to couple with hooks of other standard existing types. Means are also provided, consisting of a rising and falling weight, or the like, for automatically opening the pivoted
25 hook when the locking pin is withdrawn, such rising and falling weight always tending to press the pivotal hook outward. A further feature of the invention relates to the means whereby, when the locking pin is raised from engagement with the tail piece of the hook, it is caught and held in such raised position, by a catch piece attached thereto and capable of moving relatively thereto and
30 is prevented from falling into the locking position until the hook is fully closed, and thus avoids being fractured by the closure of the pivotal hook, a projection on the pivotal hook being provided for disengaging the catch mechanism on the pin and releasing it from its set position as the pivotal hook is closed, thus allowing it to drop automatically into the locked position.

35 In the accompanying drawings:—

Figure 1 is a plan view of a pair of automatic couplers interlocked with each other;

Figure 2 is a sectional plan view of the couplers disengaged, showing one in the closed position, and the other in the open position. The device for
40 automatically opening the pivotal hook is included, though it would only be visible in part, if the section be on the central axis of the coupler.

Figure 3 is a perspective view of my automatic coupler in the open position; and

Figure 4 is a vertical longitudinal section of my automatic coupler, the full
45 lines showing the coupler in the closed position, and the dotted lines showing the coupler in the open position.

In the said drawings, 1 denotes the drawbar of the coupler carrying the drawhead 2 provided at one side of the centre line with the bearing socket 5 for the pivotal pin 4 of the coupling hook. The pivotal hook is provided with

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overhanging lugs 3 formed on the upper and lower faces of the hook, such lugs engaging above and below the bearing socket 5, and connected thereto by the pivotal pin 4. This pivotal coupling hook is formed of an outer element or knuckle member 6, and an inner element 7. The front face 8 of this outer element is flat and disposed at right angles to the direction of impact when the hook is in the closed position, and the inner face 9 on the axial line of the coupler is also flat, and at right angles to the pull when the hook is closed. The inner face 10 of the inner element of the pivotal hook is made flat, to bed when closed against the central flat portion 11 of the drawhead 2, so that when the hook is closed any buffing impact on the outer element of the hook, will be met by direct thrust against the drawhead, the faces being disposed at right angles to the direction of impact. The opposite face of the drawhead at the other side of the centre line is provided with an inclined deflecting impact surface 12, the arrangement being such that there is a clearance space 13 left between this inclined deflecting impact surface 12 of one coupler, and the outer element 6 of the hook of an adjacent coupler, for the purpose of enabling two buffers to couple when the vehicles are on a curve, also give lateral play to the coupler when the vehicles are going round a curve. The central portion of the drawhead 2 between the bearing socket and the inclined impact face 12, is slotted horizontally at 14 to receive a projecting tail piece or eye 15 on the pivotal hook 6, 7. Vertically through this horizontal slot is formed a socket 16, within which is slidably mounted a locking pin 17 of any suitable section. The locking pin is fitted with a hanging pivoted pawl or catch 18 provided with a rear heel 19, such heel 19, as the locking pin 17 is raised, being engaged by an abutment 20 in the drawhead 2, which forces out the pawl 18 from its slot in the locking pin 17 and causes it as the pin falls again to engage upon a ledge 21 in a recess 22 formed in the upper part of the drawhead 2. Disposed, preferably, in that part of the drawhead near the bearing socket, is a vertical chamber 23 within which is slidably mounted a weight 24, such weight being fitted with a projecting prong 25 or the like normally resting on and bearing against the inner element 7 of the pivotal hook, in a suitable recess 26, in such manner, that the action of the weight 24 tends to cause the hook to open out from the drawhead 2 on its pivot 4, and retain it in its fully open position against a suitable abutment 27 as shown on the right hand coupler of Figure 2. The lower part of the weight chamber 23 is provided with a stop 28 which may be adjustable, such stop limiting the fall of the weight 24 and preventing the prong 25 from assuming a horizontal position, and thus avoids any liability of the weight 24 binding in the chamber 23 when the pivotal hook is closing.

The outer element 6 of the hook has a horizontal slot 29 made in it, and is vertically perforated at 30 to provide for the ordinary connection with the usual coupler by means of a coupling link. The tail piece 15 has an upstanding rib 31 at its edge to give a good impact surface for such coupling link to impact against, such surface being deeper than the slot 29, to prevent such coupling link mounting the tail piece 15 when in the open position. From preferably the central part of the inner element 7 of the hook projects the tail or eye piece 15 aforesaid, adapted to engage within the horizontal slot 14 of the drawhead, and when the hook is closed, register with the sockets 16 of the locking pin 17 in the drawhead 2. When therefore the hook is closed, the perforation 32 in the tail piece 15 registers with the locking pin 17 in the drawhead, and when the locking pin 17 is down, the coupling is locked. A projection 33 on the tail piece 15 of the inner element 7 of the hook, is so arranged that when the hook is in its open position (shown on the right-hand of Figure 2) such projection masks the socket 16 of the locking pin 17, and prevents the latter from falling below the tail piece 15 except when the hook is closed. A tongue 34 is also provided preferably at the upper part of the inner face 10 of the hook, such tongue being adapted to engage and press the hanging pawl 18

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of the locking pin 17 in the drawhead 2 as the hook closed, thus enabling the locking pin to fall into engagement with the eye or tail piece 15.

The operation of my improved coupler may be briefly summarised as follows:—When the hook 6, 7, is swung inwards, the locking pin 17 falls, thus locking the hook in the closed position. When the coupling pin 17 is lifted until the hanging pawl 18 engages on the ledge 21 of the drawhead, the coupling hook is liberated, and swings open automatically on its pivot pin 4 by the operation of the falling weight into the position shown on the right-hand of Figure 2. The said coupler is now ready for automatic coupling with the closed coupler of an opposing vehicle, such as shown on the left-hand of Figure 2, when two vehicles come together. On such taking place, the impact of the rounded corner of the inner element 7 of the open hook, coming against the flat surface 8 of the outer element 6 of the closed hook, (which surface is disposed at right angles to the direction of impact), swings the open hook inwards so that the tongue 34 on the hook disengaging the hanging pawl 18, enables the locking pin 17 to fall into the lowermost position, and the two hooks thus become interlocked together, as shown in Figures 1 and 4. In this position the pull on the engaged outer elements 6 of the two pivotal hooks is in a direct axial line with the locking pins 17 in the drawhead 2, and the pull is maintained in a central line through the drawhead to the drawbar 1 of the coupler; the pull is thus taken up by the surface of the pin and consequently by the surfaces of the drawhead which face the pin extending on both sides of the central line or line of draught. In case opposing vehicles come together, when both hooks are in the open position, the outer elements 6 of the hooks impact against the inclined impact faces of the tail pieces 15, and swing both hooks inwards, so that they interlock together. In the event of two opposing vehicles coming together when both hooks are closed (as frequently happens in shunting operations), the buffing impact takes place on the outer elements 6 of the hooks, the disposition of which with reference to the drawhead is such, that the direct line of such impact will be through the outer elements 6 of the hooks, the flat inner engaging face 10 of the inner elements bearing against the corresponding surfaces 11 of the drawheads; that is to say the buffing impact is taken up directly by the surface 11 on the drawhead extending on both sides of the line of draught; this could be taken up by the pin 17 on the surface which is normal to and extends on both sides of the line of draught although it will be readily understood that the drawhead is preferred. A further advantage of the construction shown in the figures is that the coupler hook has an approximately uniform dimension equal to that of the drawhead and extending right up to it, such dimension being in a vertical direction parallel to the longitudinal axis of the locking pin. This feature is readily perceived from Figure 3; the uniform dimension is in the vertical direction and applies both to the drawhead and the hook extending from the tip of the hook to the drawhead, thus ensuring that a maximum section takes up the entire compressive strains.

In a modification, in place of the lugs 3 on the pivotal hook engaging above and below the bearing socket 5 of the drawhead, upper and lower lugs may be formed on the drawhead, between which lugs on the pivotal hook engage.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. In an automatic coupler, the combination of a drawhead, a coupling hook pivotted therein, and adapted to be turned inwards and outwards, a slidably mounted weight disposed in the drawhead, such weight being provided with a projecting prong normally resting on and bearing against the inner face of the pivotal hook in such manner, that the weight tends to cause the hook to open out from the drawhead into the open position.

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2. In an automatic coupler, the combination of a drawhead, a coupling hook pivotted therein, and adapted to be turned inwards and outwards, a vertical chamber disposed in the drawhead, a slidably mounted weight therein, a prong projecting from the weight, a recess in the inner element of the hook in which the end of the prong rests so as to tend always to press the pivotal hook out- 5
wards, and a suitable abutment against which the hook rests in its open position.

3. In an automatic coupler, the combination of a drawhead, a coupling hook pivotted therein, and adapted to be turned inwards and outwards, a movable weight tending to turn said hook outwards, a vertical chamber disposed in the drawhead in which said weight is placed, and an adjustable stop for limiting the 10
fall of the weight in the said chamber.

4. An automatic coupler in which surfaces approximately normal to and extending on both sides of the line of draught are provided for taking up the forces due to buffing impacts on the tail pieces of the opposing coupler hooks when in the closed position. 15

5. An automatic coupler in which surfaces approximately normal to and extending on both sides of the line of draught are provided adapted to take up the entire strains whether due to tension or to buffing impacts on the opposing coupler hooks when in the closed position.

6. In an automatic coupler, the combination of a drawhead, a coupling hook 20
pivotted therein, and adapted to be turned inwards and outwards, a projecting tail piece on the inner face of the pivotal hook, adapted to enter a slot in the drawhead, a locking pin adapted to pass when in its down position through this tail piece, a ledge in connection with the locking pin hole, a pawl or catch in the locking pin, and means for forcing this catch when the locking pin is 25
in the raised position, into engagement with the ledge.

7. In an automatic coupler, the combination of a drawhead, a coupling hook pivotted therein and adapted to be turned inwards and outwards, a projecting tail piece on the inner face of the pivotted hook adapted to enter a slot in the central flat portion of the drawhead, a locking pin in the drawhead adapted to 30
pass when in the down position through this tail piece, a catch mechanism in the coupling pin adapted to hold the coupling pin raised when the hook is open, a recess on the central portion of the drawhead, and a projection on the inner face of the hook adapted to enter this recess when the hook is closed, for disengaging the catch on the coupling pin so as to release the same. 35

8. An automatic coupler in which surfaces are provided on the drawhead normal to and extending on both sides of the line of draught adapted to take up the forces on the tail pieces of the opposing coupler hooks when in the closed position due to buffing impact.

9. An automatic coupler in which the tail piece of the coupler hook abuts 40
in the closed position against a surface on the drawhead approximately normal to the line of draught, a projecting portion of said tail piece being provided with a slot which when the coupler is in the closed position registers with a corresponding slot or slots in the drawhead through which the locking pin passes. 45

10. An automatic coupler as claimed in any of the preceding claims in which the locking member which serves to lock the coupler hooks in the closed position is provided with a catch piece attached to and adapted to move relatively to said member to lock the member in the disengaged position and to release it when acted on by a projecting member on the tail piece of the coupler 50
hook when the coupler is closed.

11. In an automatic coupler, as claimed in any of the preceding claims a coupler hook so shaped as to have an approximately uniform dimension equal to that of the drawhead in a vertical direction at right angles to the line of draught said dimension remaining constant between plane surfaces which extend 55
from the tip of the coupler hook to the base where it abuts against the drawhead, substantially as and for the purposes described.

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12. The automatic coupling device for railway carriages, wagons or the like, constructed, arranged and operating substantially as hereinbefore described with reference to and shown in the drawings annexed.

Dated this 23rd. day of February, 1914.

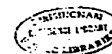
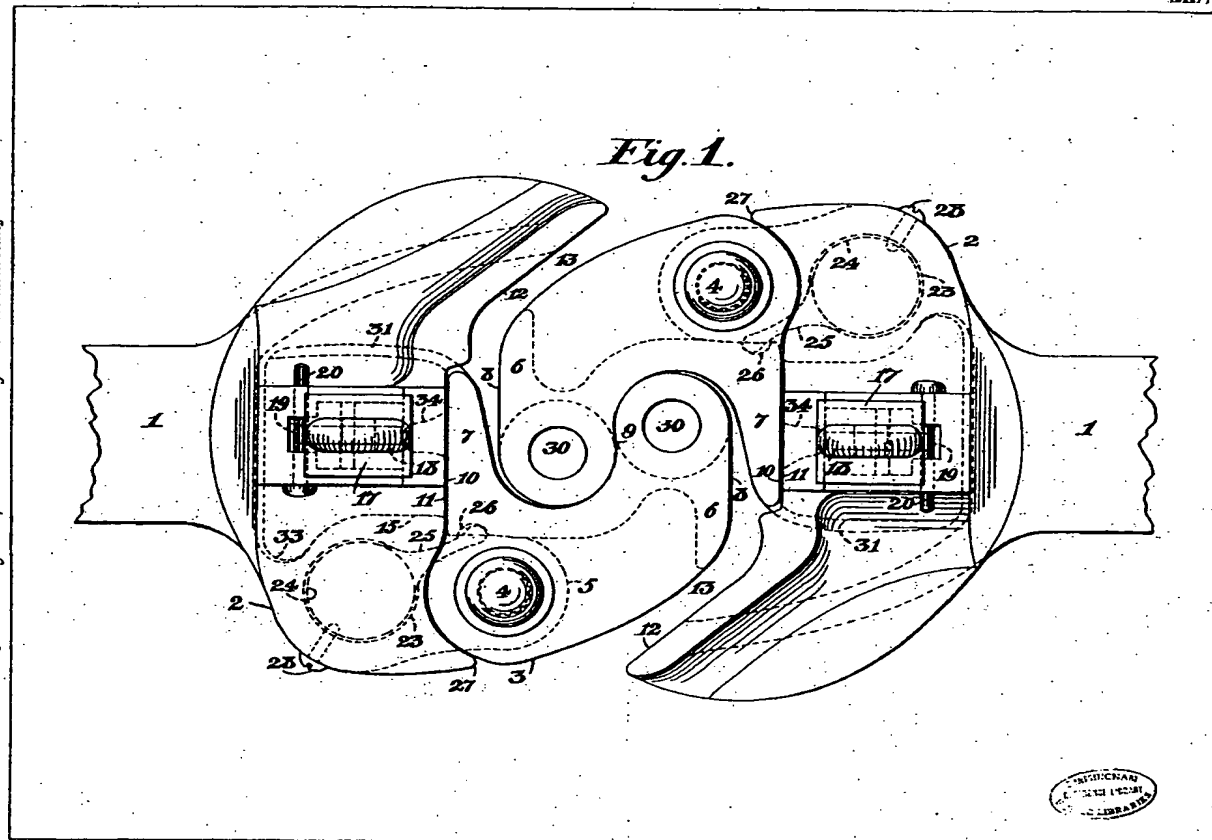
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For the Applicant,

W. P. THOMPSON & Co.,
6, Lord Street, Liverpool, and at
Bradford and London,
Chartered Patent Agents.

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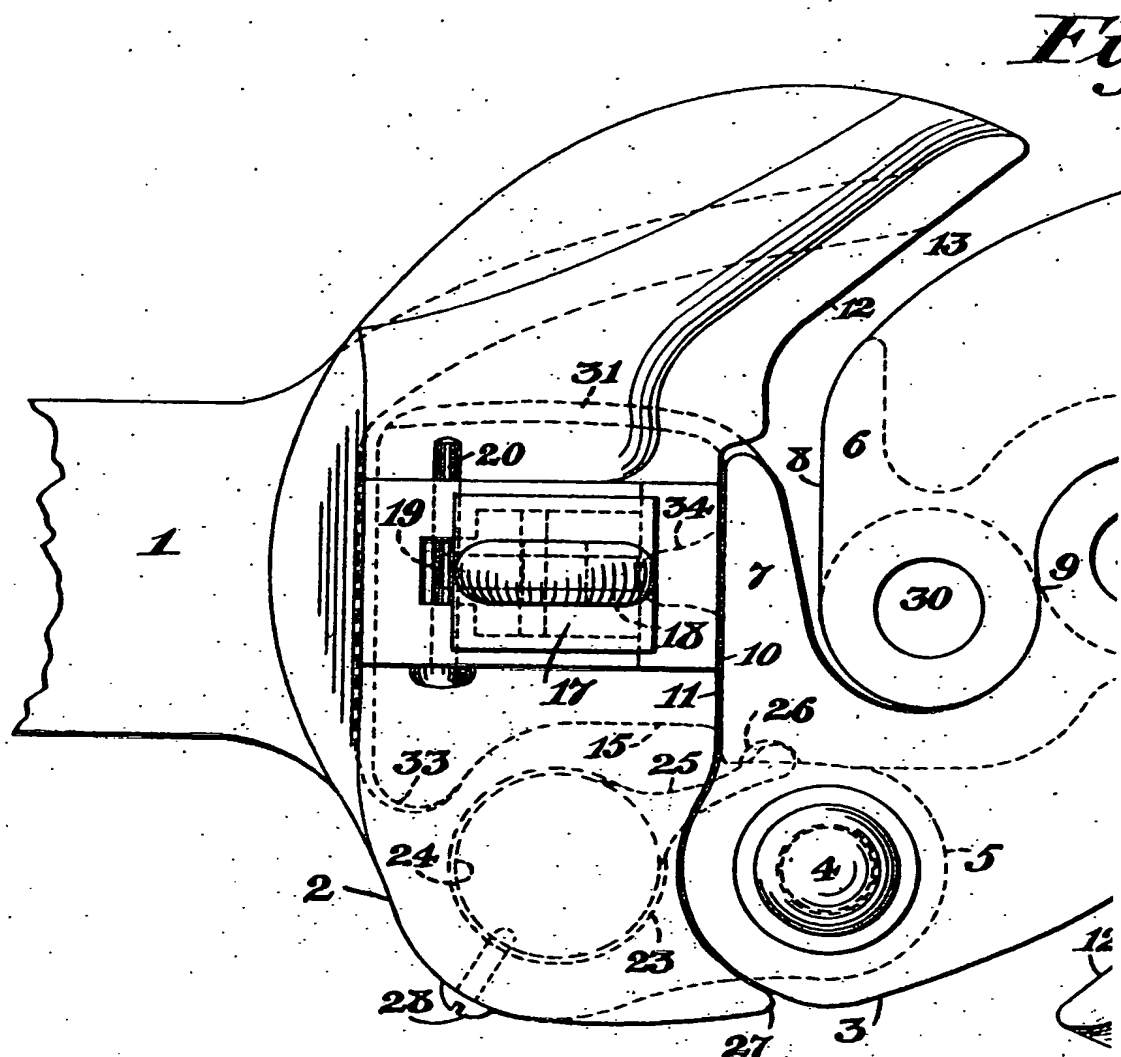
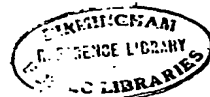
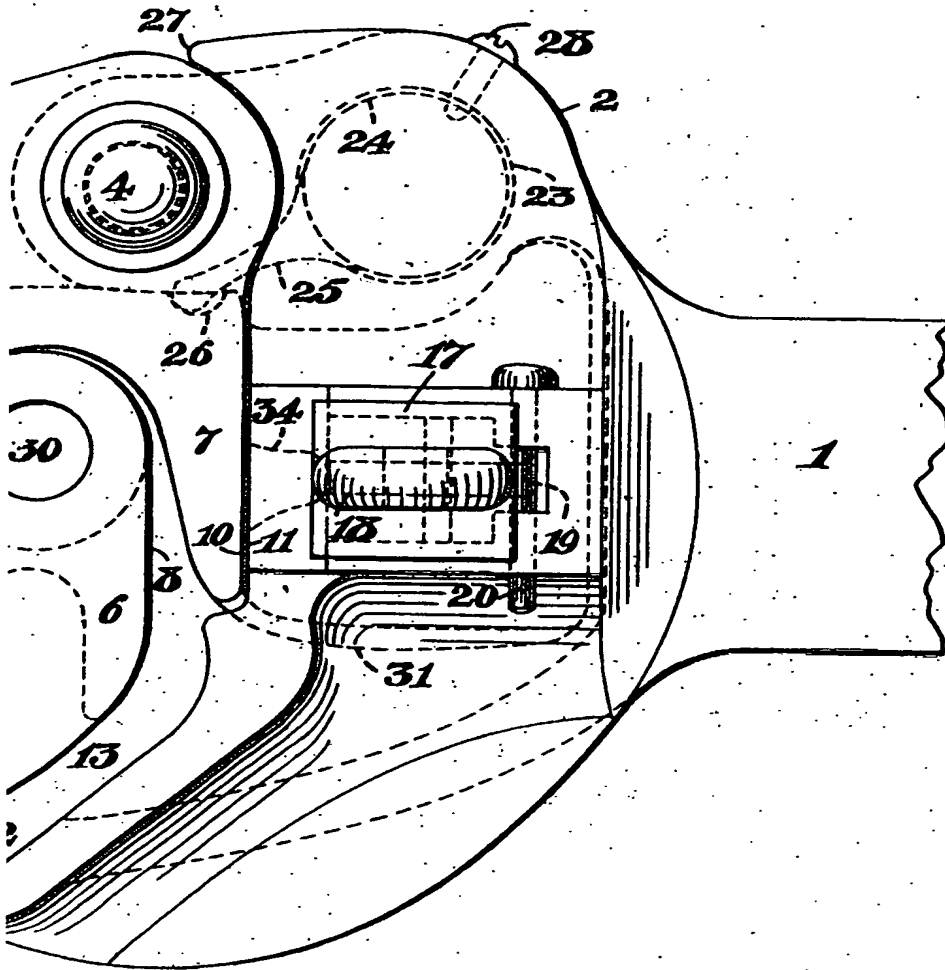


Fig. 1.



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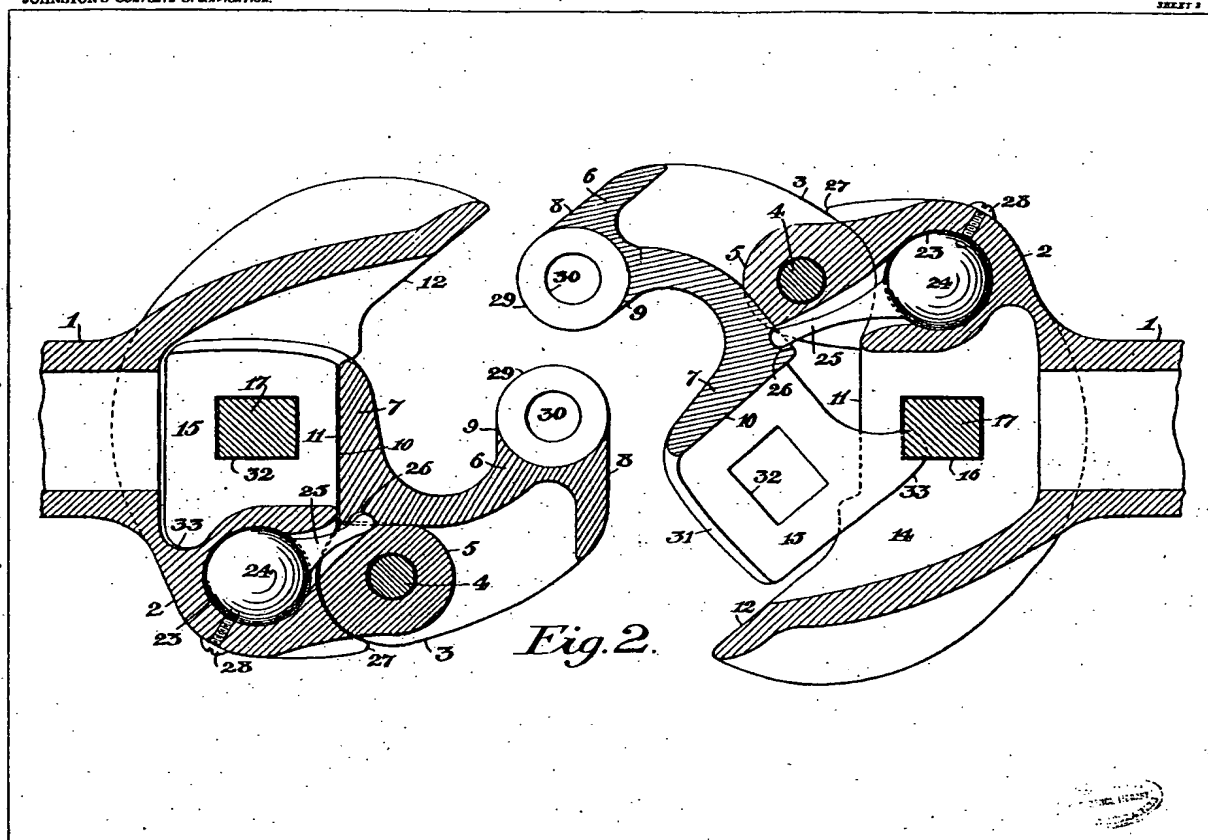
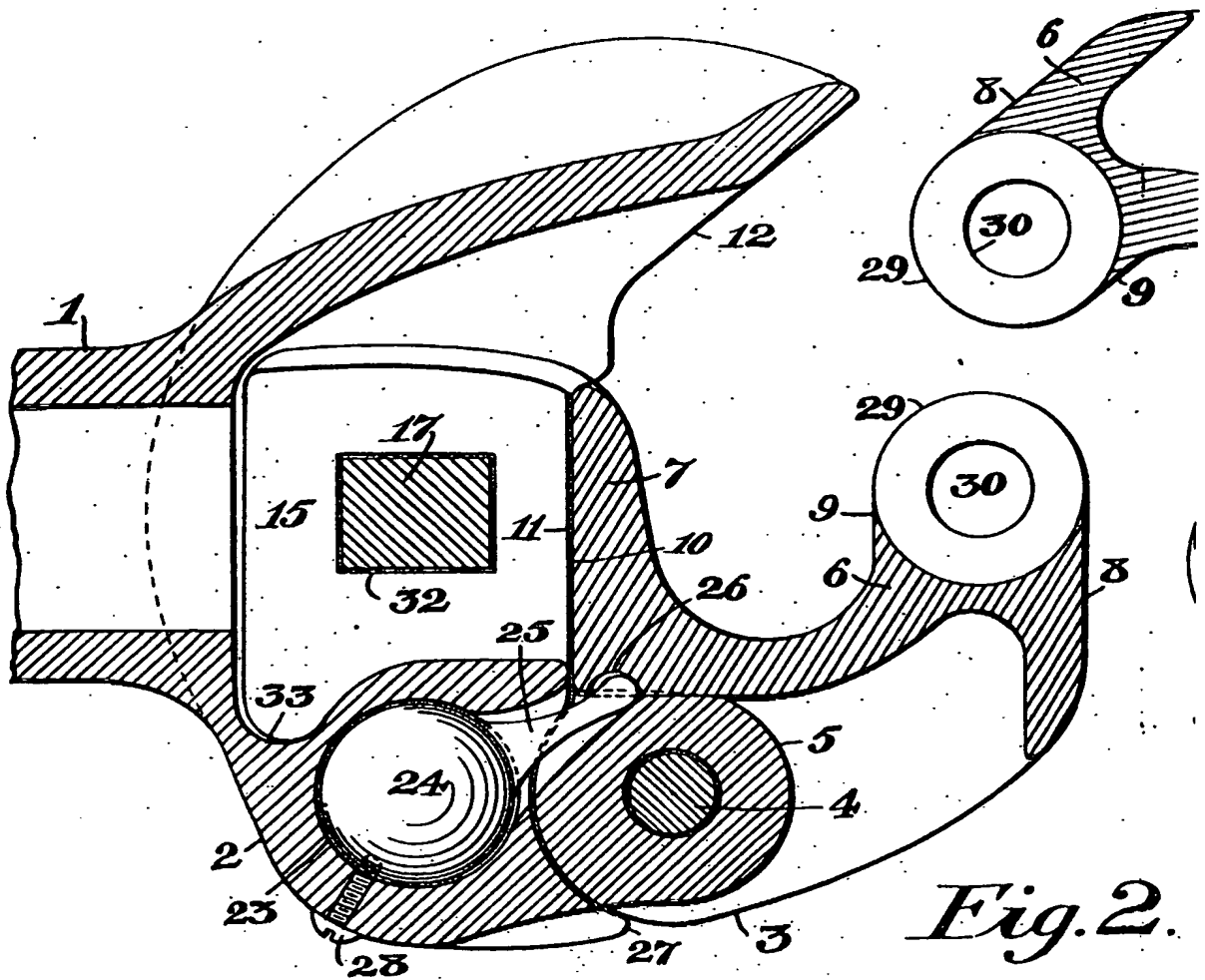
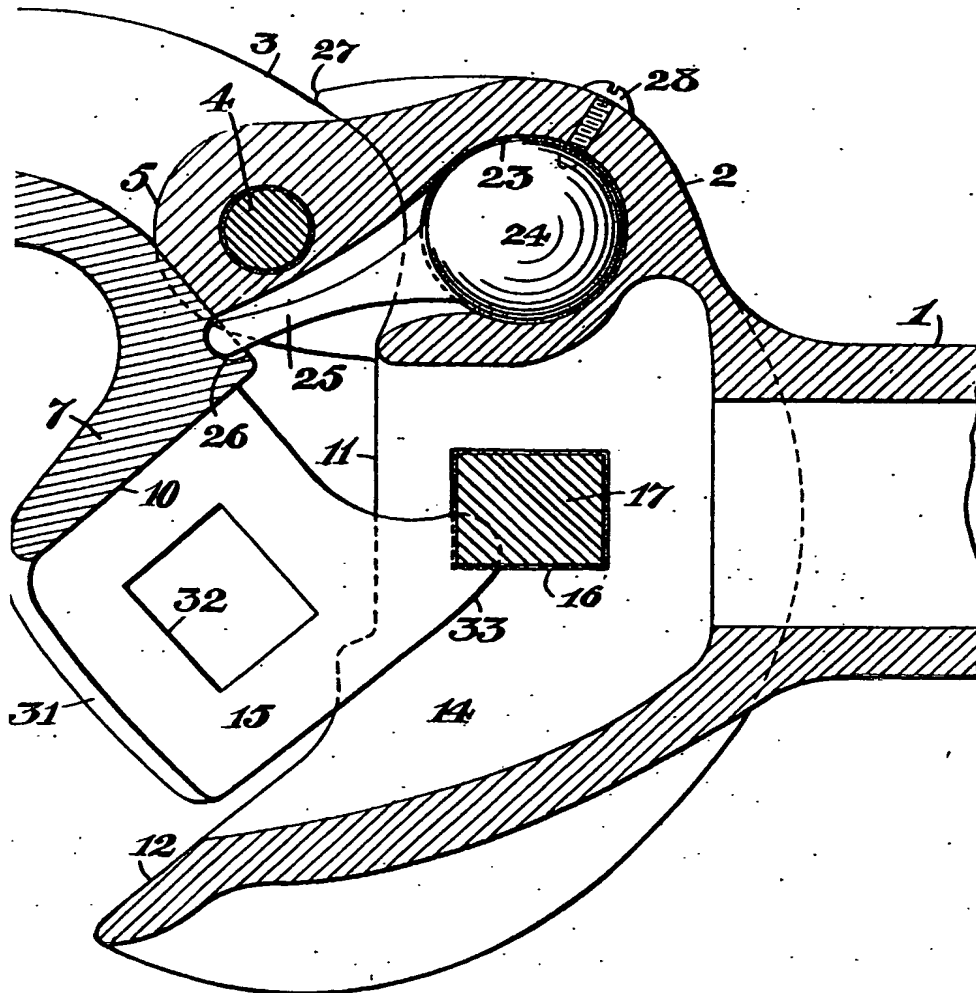


Fig. 2.

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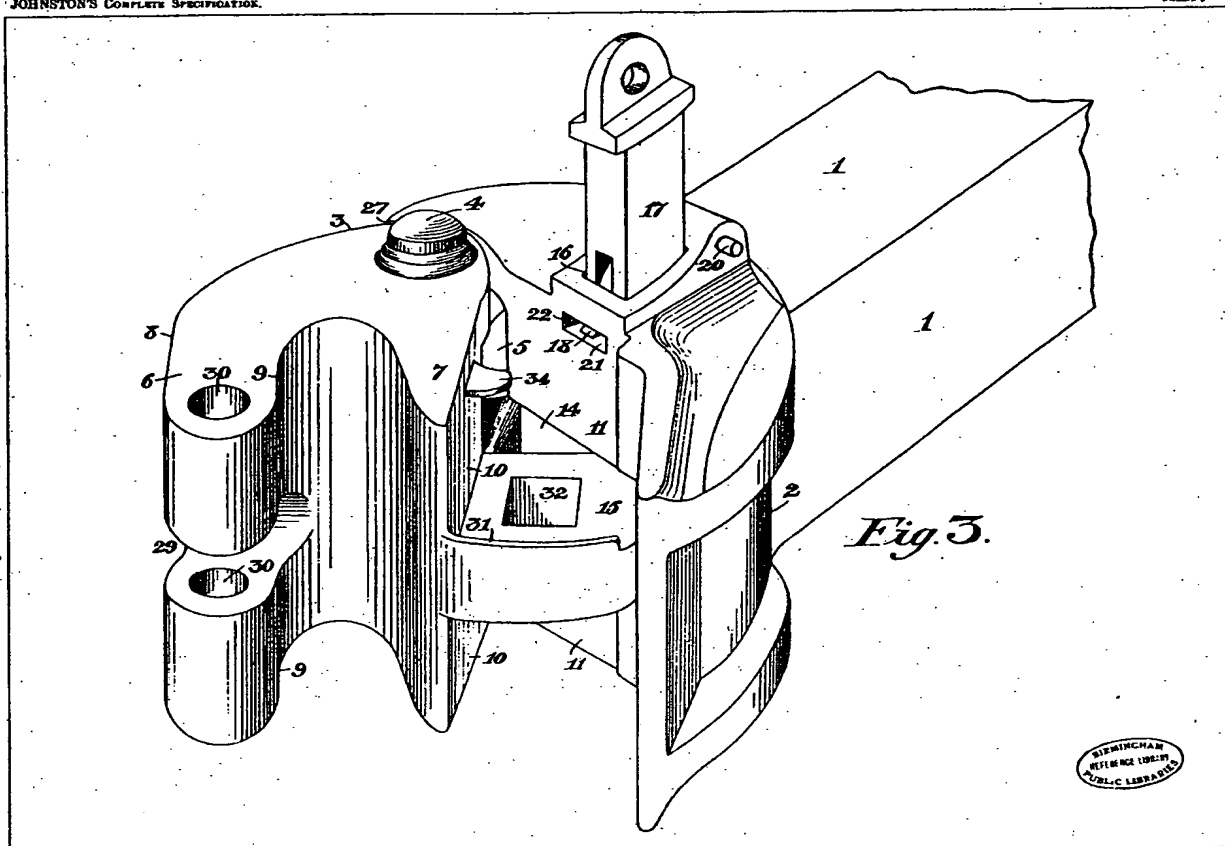




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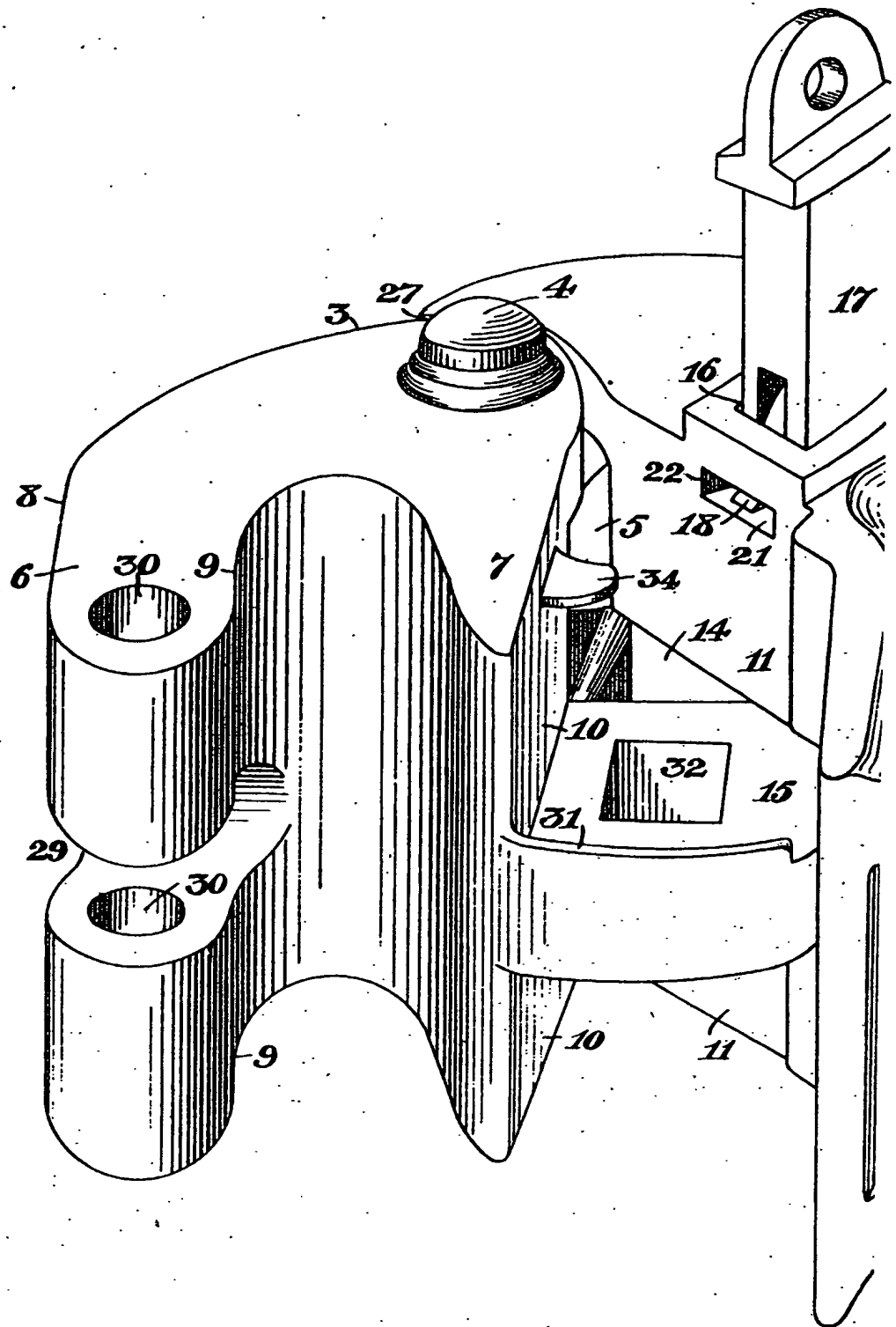
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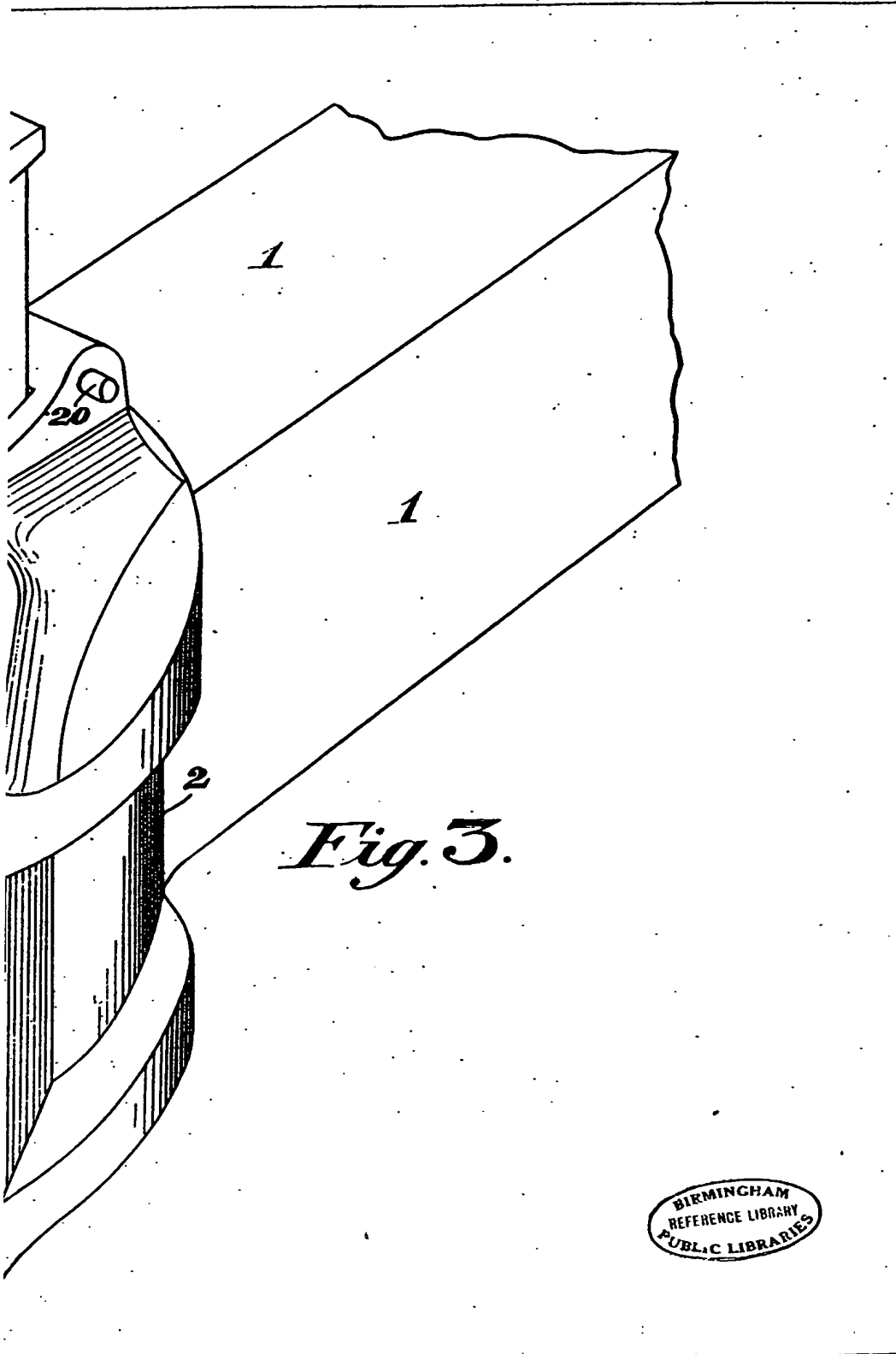
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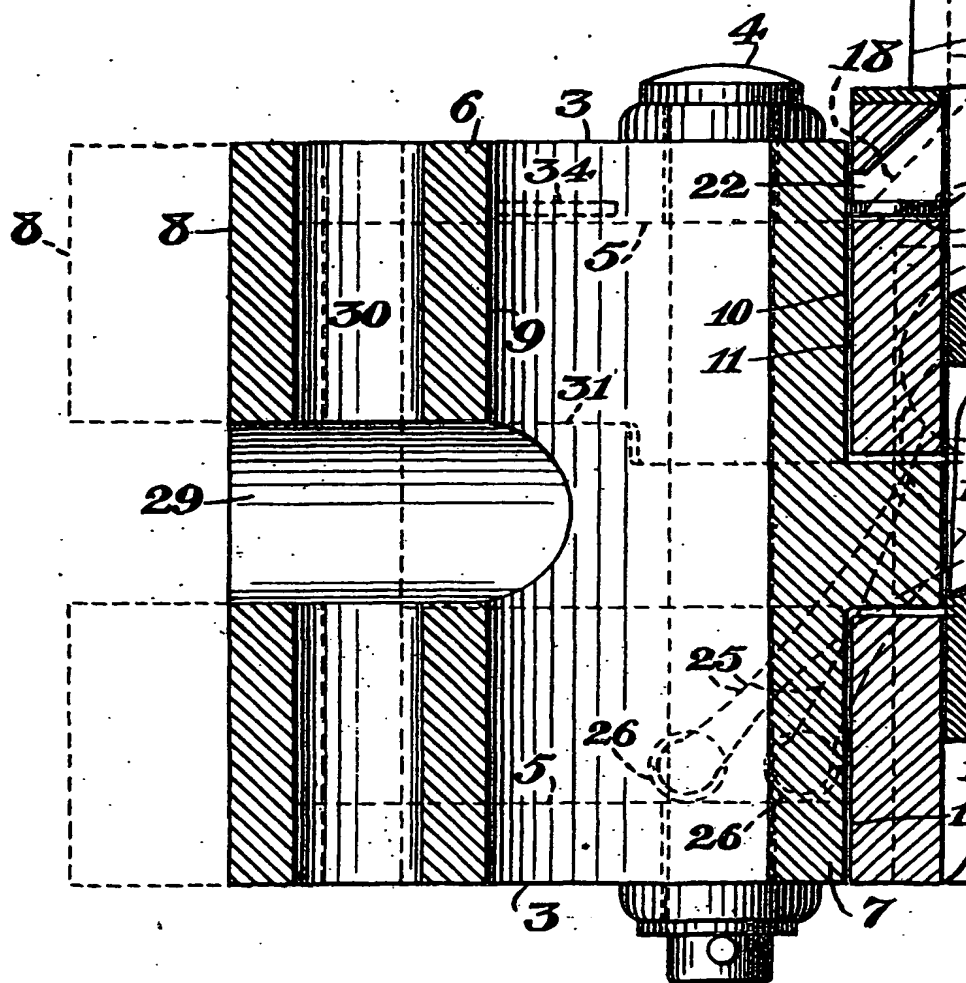
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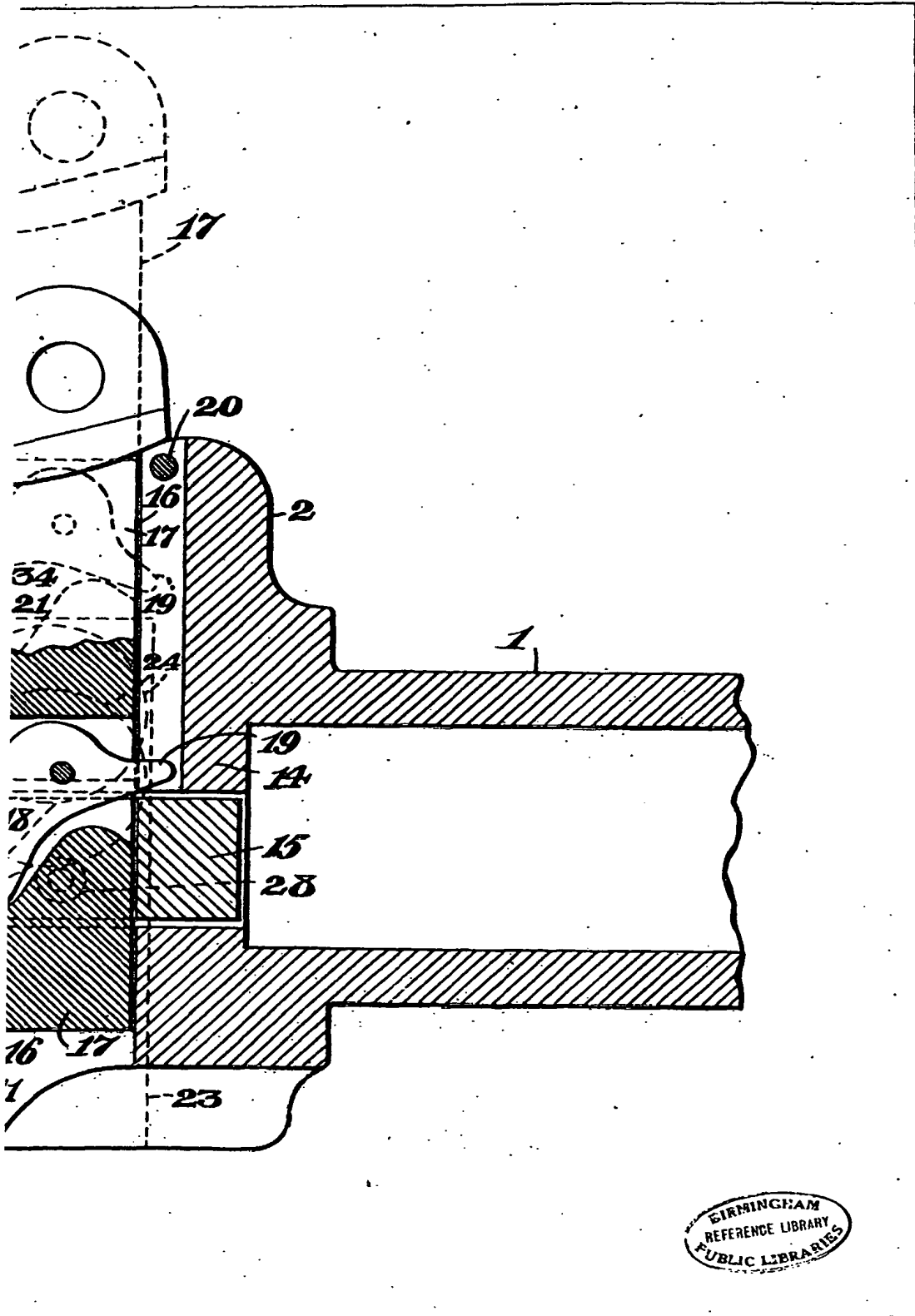


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Fig. 4.



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